

August 1, 2003

Express Mail Label No.: EU877546721US

PATENT

UNITED STATES PATENT APPLICATION

of

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for

SUPPORT FOR SURVEY ROD

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] This invention relates to a support for holding a survey rod.

Description of the Related Art

[0002] United States patent nos. 4,192,076; 4,290,207; 4,339,880; 4,356,637; and 4,366,940 all cover devices to hold survey rods. Such devices, however, all employ tripods; and the legs of these devices do not automatically extend and retract as one forcibly plants, *i.e.*, places the tip of the survey rod on a surface and pushes a portion of the device toward the surface, and lifts the rod.

[0003] The legs of the tripods for the stands of United States patent nos. 4,988,064 and 5,934,628 do automatically extend and retract as the tripod is placed and removed; but the implements of these patents cannot hold a survey rod in such a manner that the tip of the rod can visibly be placed on a survey point. Even if the survey rod could replace the main post **11** in the device of patent no. 4,988,064, the lower holding member **40** would preclude the tip of the rod from reaching a survey point. Similarly, even if the survey rod could be placed in the lower tubular section **12** of the device of patent no. 5,934,628, base **18** in the first embodiment would preclude the tip of the rod from reaching a survey point; and the lower tubular section **12** in the second embodiment would preclude viewing of the tip of the rod reaching a survey point.

BRIEF SUMMARY OF THE INVENTION

[0004] The Support for Survey Rod of the present invention preferably comprises a collar which attaches, preferably releasably, to a survey rod, allowing the tip of the survey rod visibly to approach and contact a survey point.

[0005] The Support further comprises a grip that slidably mounts to the survey rod.

[0006] A first end of each of two legs is rotatably attached to the grip. A first end of each of two spring rods is attached, preferably removably and also preferably to the collar. A second end of one spring rod is connected to one of the two legs, and a second end of the other spring rod is connected to the other of the two legs. The second ends of the spring rods are always farther from an axis running between the collar and the grip than are the first ends of the spring rods so

that when a survey rod has been placed in the collar and in the grip, putting the tip of the survey rod on the ground and pushing toward such tip with the grip, which may be done with a single hand, will automatically extend the legs and lifting the grip, which, again, may be done with a single hand, will automatically cause the legs to retract.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0007] FIG. 1 shows the Support containing a survey rod with the legs of the Support retracted.

[0008] FIG. 2 portrays the Support containing a survey rod with the legs of the Support extended using resilient spring rods.

[0009] FIG. 3 displays the Support containing a survey rod with the legs of the Support extended using rigid rods.

DETAILED DESCRIPTION OF THE INVENTION

[0010] Global Positioning Satellite (GPS) surveying equipment must remain upright in order to receive signals from the satellites upon which such a system is based. Similarly, laser reflectors must remain upright in order to maintain contact with automatic measuring stations. In both cases, however, the rod which supports the GPS surveying equipment or the laser reflector can lean somewhat. And occasionally it is desirable for a surveyor to release a survey rod without laying it on the ground.

[0011] The present invention provides a support for a surveying rod that meets the requirements discussed above and which can be operated with just one hand.

[0012] A grip 1 is slidably mountable on a survey rod 2.

[0013] Rotatably attached to the grip 1 is a first end 3, 4 of each of two legs 5, 6.

[0014] A first end 7, 8 of each of two spring rods 9, 10 is attached, preferably releasably, to the survey rod 2 below the grip 1 and preferably near the lower end 11 of the survey rod 2. Preferably, the first end 7, 8 of each of the spring rods 9, 10 is attached to a collar 12 having an aperture 13 so that the collar 12 is able to move along, *i.e.*, be slidably mounted to, the survey rod 2 to a desired position 14, at which point 14 a fastener, preferably a releasable fastener such as a thumb screw 15 is adjusted to maintain the collar 12 at that desired point 14.

[0015] A second end 16 of the first spring rod 9 is attached to the first leg 5 below the point of rotation 17 for such first leg 5, and a second end 18 of the second spring rod 10 is attached to the second leg 6 below the point of rotation 19 for such second leg 6.

[0016] In the position for transporting the Support, the spring rods 9, 10 and the legs 5, 6 are generally adjacent to the axis 20 running between the collar 12 and the grip 1, *i.e.*, the area of the Support intended to be occupied by the survey rod 2, although the second ends 16, 18 of the spring rods 9, 10 are farther from the axis 20 than are the first ends 7, 8 of the spring rods 9, 10. (When the first end 7, 8 of each of the two spring rods 9, 10 is attached directly to the survey rod 2, the second ends 16, 18 of the spring rods 9, 10 are, of course, farther from the survey 2 than are the first ends 7, 8 of the spring rods 9, 10.)

[0017] When it is desired to have the Support hold the survey rod 2 in an elevated position, the tip 21 of the lower end 11 of the survey rod 2 is placed on a surface; and the grip 1 is pushed toward the lower end 11 of the survey rod 2. Because the second ends 16, 18 of the spring rods 9, 10 are farther from the survey rod 2 than are the first ends 7, 8 of the spring rods 9, 10, this forces the second ends 16, 18 even farther from the survey rod 2, thereby pushing the lower ends 22, 23 of the legs 5, 6 farther from the survey rod 2 and creating a stable Support for the survey rod 2.

[0018] The first end 3, 4 of each leg 5, 6 preferably has a bevel 24, 25 which rotates toward and eventually against the grip 1 as each leg 5, 6 is extended and thereby limits the extension of such leg 5, 6.

[0019] Preferably, the spring rods 9, 10 are substantially straight, *i.e.*, are sufficiently close to being perfectly straight that one of ordinary skill in the art would consider them to be straight. Also preferably, the spring rods 9, 10 are not rotatably attached to the collar 12 (or the survey rod 2). Finally, the spring rods 9, 10 are preferably resilient, which means that, if bent, the spring rods 9, 10 tend to return to their substantially straight status when the bending force is removed. Thus, in this preferred embodiment, when a survey rod 2 has been inserted into the collar 12 and the grip has been slidably mounted on the survey rod 2, preferably by having the survey rod 2 placed into an aperture 26 in the grip 1 (although a channel or any other method of slidable mounting that is well known in the art could be utilized), placing the tip 21 of the survey rod 2 on a surface and pushing the grip 1 toward the lower end 11 of the survey rod 2 will cause the

spring rods **9, 10** to curve up and outward from their point of attachment to the survey rod **2** (or, preferably, the collar **12**) (a feature which has not been illustrated herein), thereby extending the legs **5, 6** and creating a force which will tend to push the grip **1** and the tip **21** as the grip **1** is lifted away from the surface. This will further cause the legs **5, 6** automatically to retract when the grip **1** is thus lifted. Frictional force between the second ends **27, 28** of the legs **5, 6** and the surface will prevent the legs **5, 6** from being retracted until the grip **1** is lifted.

[0020] Preferably, the spring rods **9, 10** are rotatably attached to the legs **5, 6**.

[0021] If the spring rods **9, 10** are rotatably attached to the collar **12** (or the survey rod **2**) and to the legs **5, 6**, such spring rods **9, 10** can be rigid.

[0022] As used herein the term “preferable” or “preferably” means that a specified element or technique is more acceptable than another but not that such specified element or technique is a necessity.